APRIL/MAY 2025

GCH31/DCH31 — ORGANIC CHEMISTRY – III

Shanmuga Industries Arts & Science College T.V.Malai

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write the factors affecting the intensity of absorption bands?

2. Why IR is important to identify the functional group?

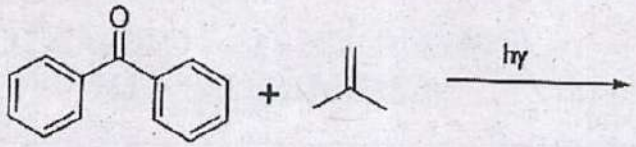
3. Discuss the influence of hydrogen bonding in the chemical shift value.

4. Why TMS is used as a standard in NMR spectroscopy?

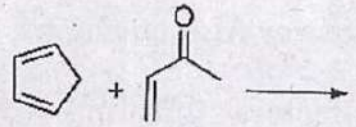
5. Explain the EI and FAB mass spectral measurement technique.

6. Describe the fragmentation pattern for benzylalcohol.

7. Identify the name of the reaction and product.



8. Identify the endo and exo product of the following reaction.



9. Draw the structure of Progesterone and testosterone.

10. Write the synthesis of guanine.

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SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Write the different type of electronic transitions with energy level diagram.

Or

15. (a) How can vitamin-A1 be synthesized using Witting methods?

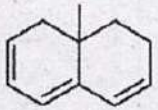
Or

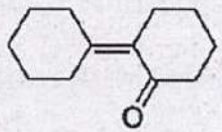
(b) Write a method of preparation of cytocine and uracil.

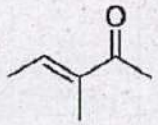
SECTION C — (3 × 10 = 30 marks)

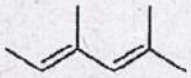
Answer any THREE questions.

16. Explain Woodward-Fieser rule and its application in calculating the λ max for the polyenes and unsaturated ketones.

(a) 

(b) 

(c) 

(d) 

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17. Write note on coupling constant, geminal coupling and vicinal coupling.

18. Discuss the following :

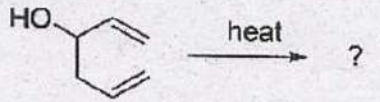
(a) Different fragmentation modes with examples

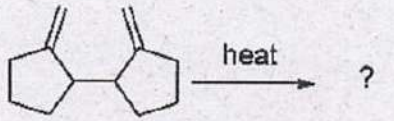
(b) Mc Lafferty rearrangement

19. (a) Write note on di-pi methane rearrangement with mechanism. (5)

(b) Identify the product and write the mechanism. (1+2+2)

(i)

(ii) 

(iii) 

20. (a) Write any one method for the preparation of thiazole, isoflavones and anthocyanins. (6)

(b) How will you convert cholesterol to estrone? (4)

(b) Compare the carbonyl stretching absorption in the following compounds :

(i) HCHO, CH_3CHO and CH_3COCH_3

(ii) CH_3COCH_3, CH_3COCH_2Cl and $CH_3COCHCl_2$

12. (a) What are the factors affect the ^{13}C NMR chemical shift value?

Or

(b) Discuss AX and AB spin system with example.

13. (a) Explain Nitrogen rule in mass spectrometry with two examples.

Or

(b) Describe the mass spectra of 4-heptanone.

14. (a) Discuss photo reduction with example.

Or

(b) Demonstrate the electrocyclic reaction of hexatriene system under photochemical and thermal conditions with energy level diagram.